

**United States of America**  
**DRAFT PROPOSAL FOR THE WORK OF THE CONFERENCE**

**Agenda Item 1.24:** to review the usage of the band 13.75-14 GHz, in accordance with Resolution **733 (WRC-2000)**, with a view to addressing sharing conditions;

**Background Information:** At WARC-92, and as modified at WRC-95, WRC-97 and WRC-2000, Nos. **5.502** and **5.503** were added to the Table of Frequency Allocations to facilitate compatibility between the existing applications of the radio services in the 13.75-14 GHz band. It was agreed that any modifications to either of these provisions contemplated to accommodate new technology, requirements or applications of the FSS, must consider the overall interference environment in the 13.75-14 GHz band and be undertaken with great care in order to avoid upsetting the delicate balance previously achieved between the services. The constraints in the provisions are based on the planned use of the band by gateway earth stations operating with GSO satellites in the FSS and are intended to limit the number of FSS earth stations to the point where sharing is possible. The present operational constraints, that satisfy the protection criteria of current operational applications and technology in the band 13.75-14 GHz, are found in Nos. **5.502** and **5.503 (WRC-2000)**.

Studies that led to the development of provisions **5.502** and **5.503** did not account for non-geostationary-satellite orbit fixed-satellite service systems (non-GSO FSS). With the introduction of non-GSO FSS into this band at WRC-97, Resolution **130 (WRC-97)** was, among other things, drafted to focus attention on the need to reexamine the sufficiency of these provisions in maintaining the delicate balance between the services sharing the 13.75-14 GHz band. At WRC-2000 Resolution **733 (WRC-2000)** was developed to review the constraints in **5.502** regarding the minimum antenna diameter of GSO FSS earth stations, the e.i.r.p limits imposed on the radiolocation service, and to identify possible alternative sharing situations to those inherent to **5.502** and **5.503** in time for WRC-03.

The introduction of non-GSO FSS earth station transmitters in the band at WRC-2000 created a potential sharing issue with the space research service (space-to-space). Provision **5.503** was modified at WRC-2000 to include an e.i.r.p. density limit on non-GSO FSS earth stations transmitters to accompany the limit on GSO FSS earth station transmitters. It was understood that review of the minimum antenna diameter limit in **5.502** called for in Resolution **733** was only in regard to GSO FSS earth stations and not in regard to non-GSO FSS earth stations. Only limited modifications to **5.502** and **5.503** could be made while continuing to retain the delicate sharing balance between the allocated services.

Studies conducted since WRC-97 and WRC-2000 have shown several salient facts:

- a) radiolocation services are already receiving interference from existing FSS earth stations, despite the small number that have been deployed.
- b) that RR No. **5.502** maintains the delicate sharing balance between the radiolocation or radionavigation service and the fixed-satellite service only by limiting the number of FSS earth stations. In particular, studies have shown that sharing with radiolocation systems is significantly more difficult for non-GSO FSS systems than for GSO FSS systems, and that if requirements for the minimum antenna diameter of the FSS earth station were relaxed, the

deployment of a large number of low data rate earth stations would collectively significantly reduce the performance of radiolocation and radionavigation systems, both airborne and shipborne.

- c) The feasibility of sharing between the space research service and the fixed-satellite service depends on limiting the number of FSS earth stations through RR No. **5.502** and by limiting the maximum power spectral density of each FSS earth station through RR No. **5.503**.
- d) That there is no practical means for protecting airborne radiolocation systems from FSS earth station emissions, and that the current situation is tolerable only because the number of earth stations is limited by the 5.502 limitations on dish diameter.
- e) ITU-R studies conducted in preparation for WRC-03, show that sharing between radiolocation systems and FSS earth stations with antennae smaller than 4.5 meters is not possible without the FSS operators employing mitigation techniques, and that current technology does not allow radar systems to mitigate interference from FSS earth stations. Mitigation techniques involving separation distance or percentage of time are neither practical nor enforceable, and no sharing proposals have been proposed that are enforceable by ITU regulations.
- f) ITU studies thus far show that separation distances of greater than 50 km are required to protect maritime radiolocation systems from VSAT earth station transmissions. However, the technique of distance separation is not effective for protecting airborne radars or space science satellite systems from harmful interference by VSAT earth stations.
- g) Studies conducted in preparation for WRC-03 show that the maximum allowable power spectral densities for FSS earth station antennae smaller than 4.5 meters, needed to ensure protection of space research operations, will not allow practical FSS VSAT implementations.

The concept of a separation distance to mitigate interference and promote sharing has been directed at using FSS earth station e.i.r.p. reductions and placing the VSAT terminals a specified distance inland from the coast. The reverse of this would be to restrict the radars a certain distance out to sea from the coast, or some combination of these approaches. Locating VSAT terminals well inland from coastlines would be the only solution that would allow maritime radiolocation systems to maintain operations close to shore. However, the enforceability of this approach is very questionable given the market needs to have VSATs placed without restrictions and noting that many population centers are located close to coasts. Requiring maritime radar systems to remain a significant distance from shore would impose severe restrictions on the ability of their host platforms to protect themselves during essential and routine operations. Therefore, the application of separation distance as a mitigation technique to protect shipborne radars against interference from VSAT earth stations is not feasible and thus it cannot be supported. Furthermore, such an approach would have no affect on protecting airborne radiolocation systems, or space science platforms.

**Proposal:**

**USA/ /1      SUP**

**Resolution 733 (WRC-2000)**

**Reasons:** Studies completed in accordance with agenda item 1.24 and Resolution **733** have not determined an effective method of preventing FSS systems operating with earth stations with antennae

smaller than 4.5 meters from creating harmful interference to other services in the 13.75-14.0 GHz band. Therefore Resolution **733 (WRC-2000)** no longer applies to **5.502** and can be suppressed.

USA/ /2 (MOD)

**5.502:** In the band 13.75-14 GHz, an earth station in the fixed-satellite service shall have a minimum antenna diameter of 4.5 m and the e.i.r.p. of any emission should be at least 68 dBW and should not exceed 85 dBW. In addition the e.i.r.p., averaged over one second, radiated by a station in the radiolocation or radionavigation services shall not exceed 59 dBW. The protection of assignments to receiving space stations in the fixed-satellite service operating with earth stations that, individually, have an e.i.r.p. of less than 68 dBW shall not impose constraints on the operation of the radiolocation and radionavigation stations operating in accordance with the Radio Regulations. No. **5.43A** does not apply. ~~See Resolution **733 (WRC-2000)**.~~

**Reasons:** Consequential, we propose *No Change* (**NOC**) to the text contained in **5.502** other than the removal of the reference to Resolution **733**.

USA/ /3 **NOC**

**5.503**

**Reasons:** Provisions **5.502** and **5.503** are integrally related in maintaining the delicate sharing balance between the radiolocation, radionavigation, space research and fixed-satellite services in the 13.75-14 GHz band. Maintaining these provisions in their current form will ensure that all services can continue to share the band in a compatible manner.

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